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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,087	10/16/2003	J. Elon Graves	23236-07266	9070

758 7590 12/17/2004

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EXAMINER

MARTINEZ, JOSEPH P

ART UNIT

PAPER NUMBER

2873

DATE MAILED: 12/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,087

Applicant(s)

GRAVES ET AL.

Examiner

Joseph P. Martinez

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-17 and 28 is/are rejected.
- 7) ☒ Claim(s) 5, 10, 11 and 18-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 5 is objected to because of the following informalities: Claim 5 does not have proper punctuation to make it a complete sentence. Appropriate correction is required. For purposes of examination, the office interprets claim 5 to be a complete sentence.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 7, 8, 12-14, 16 and 28 rejected under 35 U.S.C. 102(b) as being fully anticipated by LaFiandra (6011639).

Re claims 1, 16 and 28, LaFiandra teaches for example in fig. 3 and 4, an adaptive optics system and a method of manufacturing a deformable mirror comprising: a deformable mirror (44) having a reflective surface (43) and an electrode surface (45, col. 4, ln. 10), the electrode surface including a plurality of electrodes (10), the reflective surface configured to deform responsive to an electric potential on one or more of the electrodes (col. 4, ln. 27-32); an insulating layer (col. 3, ln. 58) formed on the electrode surface of the deformable mirror, the insulating layer exposing at least a portion of the electrodes (col. 3, ln. 58-60 and col. 3, ln. 21-

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29); and a plurality of conductive traces (49) formed on the insulating layer, each conductive trace coupling an electrode (10) to a perimeter region (at 51) of the deformable mirror.

Re claim 12, LaFiandra teaches for example in fig. 3 and 4, a deformable mirror for an adaptive optics system, the mirror comprising: a reflective surface (43) having a central region for receiving light; an electro-restrictive material (20, 22) configured to deform responsive to an electric potential (col. 4, ln. 22-32), wherein a deformation of the electro-restrictive material causes the reflective surface to deform (col. 4, ln. 22-32); a plurality of electrodes (10) coupled to the electro-restrictive material (20, 22), each electrode for providing an electrical potential (via 32) to a portion of the electro-restrictive material; and a plurality of electrical connectors (49), each electrical connector electrically coupling (col. 4, ln. 14-16) an electrode to a perimeter region (at 51) of the deformable mirror.

Re claims 2 and 3, LaFiandra further teaches for example in fig. 3 and 4, the deformable mirror (44) comprises an electro-restrictive or piezoelectric material (20, 22) that deforms responsive to an electrical field caused by an electric potential on one or more of the electrodes (col. 4, ln. 22-25).

Re claims 7, 13 and 14, LaFiandra further teaches for example in fig. 3 and 4, the perimeter region of the mirror corresponds to an edge of the mirror (at 51), a region of the mirror that does not substantially deform (at 51, wherein the office interprets the edge of the mirror of fig. 4 to disclose missing electrodes at the periphery of the mirror and therefore, does not

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substantially deform at that location) or outside the placement of electrodes (at 51, wherein the office interprets the edge of the mirror of fig. 4 to disclose missing electrodes at the periphery of the mirror).

Re claim 8, LaFiandra further teaches for example in fig. 3 and 4, a circuit board (col. 4, ln. 22, wherein the office interprets control electronics to disclose the claimed limitation) having plurality of conductors thereon (inherent to the circuit board, as is known in the art), each of the conductors for providing an electric potential (via 32) to an electrode (10) for deforming the deformable mirror (col. 3, ln. 60-62); and a strip connector (51) coupled between the circuit board and the deformable mirror (col. 4, ln. 15-16), the strip connector including a plurality of conductors (32) for electrically coupling the conductors on the circuit board to corresponding conductive traces (49) on the insulating layer of the deformable mirror (col. 4, ln. 23-25).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 4, 9 and 17 rejected under 35 U.S.C. 103(a) as being unpatentable over LaFiandra (6011639).

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Re claims 4 and 17, LaFiandra teaches for example in fig. 3 and 4, each conductive trace (49) is coupled to at the perimeter region (at 51) of the mirror.

But, LaFiandra fails to explicitly teach a bonding pad.

However, LaFiandra teaches the use of connectors (51). Furthermore, the office interprets the use of connectors to include bonding pads, as is well known in the art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of LaFiandra to include bonding pads in the connectors in order to facilitate connection of the conductive wires to the control electronics.

Re claim 9, LaFiandra teaches for example in fig. 3 and 4, a strip connector (51).

But, LaFiandra fails to explicitly teach the strip connector is a zebra strip connector.

However, the office interprets the connector of LaFiandra to be equivalent to a strip connector.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a strip connector, since connectors and strip connectors are known equivalents in the art and the selection of any of these known equivalents would be within the level of ordinary skill in the art.

2. Claims 5 and 6 rejected under 35 U.S.C. 103(a) as being unpatentable over LaFiandra (6011639) and Gee et al. (20020131146).

Re claims 5 and 6, LaFiandra teaches for example in fig. 3 and 4, conductive traces (49).

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But, LaFiandra fails to explicitly teach a protective coating covering at least a portion of the conductive traces, wherein the protective coating comprises a dielectric material.

However, within the same field of endeavor, Gee et al. teaches for example, electrodes couple to lines which couple to drive circuitry (para. 0036), including a protective coating (para. 0036) covering at least a portion of the conductive traces (para. 0036), wherein the protective coating comprises a dielectric material (para. 0036).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of LaFiandra with the protective coating of Gee et al. in order to provide a protection, as taught by Gee et al. (para. 0036).

Allowable Subject Matter

Claims 10, 11 and 18-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art taken alone or in combination fails to anticipate or fairly suggest the limitations of the claims, in such a manner that a rejection under 35 USC 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as presented in dependent claims 10, 11 and 18.

Specifically regarding claim 10, LaFiandra teaches the state of the art of an adaptive optics system.

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But, LaFiandra fails to explicitly teach the bonding pads of the mirror and circuit board form a generally circular pattern corresponding to each other at the perimeter region of the mirror, as claimed.

Specifically regarding claim 11, LaFiandra teaches the state of the art of an adaptive optics system.

But, LaFiandra fails to explicitly teach a retaining plate mechanically coupled to the circuit board for providing a compressive force on the strip connector between the deformable mirror and the circuit board; and a resilient element disposed between the deformable mirror and the retaining plate for modulating the compressive force, as claimed.

Specifically regarding claim 18, LaFiandra teaches the state of the art of an adaptive optics system.

But, LaFiandra fails to explicitly teach forming the electrode surface comprises: masking an electrode pattern on a back surface of the deformable mirror, the electrode pattern defining a plurality of electrode segments; depositing a conductive layer on the back surface to form the plurality of electrode segments; forming the insulating layer on the electrode surface comprises: masking an insulator pattern over the electrode segments, the insulator pattern exposing at least a portion of each electrode segment; depositing an insulating material over the electrode segments according to the insulator pattern; and forming the conductive traces on the insulating layer comprises: masking a trace pattern for defining a plurality of connections, each connection from an exposed location of an electrode segment to a location in a perimeter region of the deformable

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mirror; and depositing conductive material to form a plurality of conductive traces according to the trace pattern, as claimed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph P. Martinez whose telephone number is 571-272-2335. The examiner can normally be reached on M-F 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
12-12-04


Hung Xuan Gang
Primary Examiner